

concentration of Ni in the depositing a silicon film is in the range of 0.01 to 0.5 at %.

A1  
When the first impurity is germanium, the first concentration of germanium in the target is in the range of 5 to 30 at %, and the second concentration of germanium in the deposited silicon film is in the range of 5 to 30 at %.

Phosphorous can be added as an additional impurity, with either nickel or germanium. The concentration of phosphorous in the target is less than  $5 \times 10^{17}$  atoms per cubic centimeter (atoms/cm<sup>3</sup>). As a result, the concentration of phosphorous in the deposited silicon film is sufficient to create a  $V_{th}$  shift.

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On page 8, please delete the paragraph at lines 5 through 15, and substitute therefor the following paragraph.

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A2  
The Ni-doping level in the silicon target depends upon the Ni-doping requirement in the as-sputtered Si film. For effective silicide-assisted crystallization, a Ni concentration of 0.01 at% to 0.5 at% is required in the silicon film. This implies that this concentration range of Ni in the Si target should be in a similar range. However, there are differences in the sputtering yield between Ni and Si atoms. Ni has a 2-3 times higher yield than Si. Therefore, it may be concluded that a lower concentration range of Ni in the Si target yields the required concentration range in the sputtered film. The concentration range of Ni in the silicon target is then in the range of 0.05 at % to 0.2 at %.

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On page 9, please delete the paragraph at lines 8 through 15, and substitute therefor the following paragraph.

A3  
Further, the Si target can be doped with P (phosphorous), in addition to doping the target with Ni or Ge. The P addition, permits the formation of lightly p-type poly-Si film. This light doping is beneficial for threshold voltage adjustment of thin film transistors (TFTs) fabricated from such poly-Si films. The level of P doping is determined based upon the magnitude of the  $V_{th}$  shift. Generally, the P concentration in the Si(Ni) or Si(Ge) target should be less than  $5 \times 10^{17}$  atoms/cm<sup>3</sup>, or less than 10ppm.

Please delete the two paragraphs beginning at page 10, line 9 and continuing through page 11, line 3, and substitute therefor the following two paragraphs.

A4  
In some aspects of the invention, the first impurity is the transition metal nickel. Then, forming a target including silicon and a first concentration of a first impurity in Step 302 includes forming a target with a first concentration of nickel in the range of 0.01 to 0.5 at %. Sputter depositing a film of silicon on the substrate including a second concentration of the first impurity in Step 306 includes depositing a silicon film including a second concentration of nickel in the range of 0.01 to 0.5 at %. However, because of the differences in yield between Si and Ni, Step 302 preferably forms a target with a first concentration of nickel in the range of 0.05 to 0.2 at %, while Step 306 deposits a silicon film including a second concentration of nickel in the range of 0.01 to 0.5 at %.

In some aspects of the invention, Step 302 forms a target including silicon, a first concentration of a nickel, and an additional third concentration of

A4  
phosphorous less than  $5 \times 10^{17}$  atoms/cm<sup>3</sup>. Sputter depositing a film of silicon on the substrate including a second concentration of nickel in Step 306 includes depositing a silicon film with an additional fourth concentration of phosphorous sufficient to create a first Vth shift in the silicon film.

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On page 11, please delete the paragraph from lines 15 through 22, and substitute therefor the following paragraph.

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A5  
In some aspects, Step 302 forms a target including silicon, a first concentration of a germanium, and an additional third concentration of phosphorous less than  $5 \times 10^{17}$  atoms/cm<sup>3</sup>. Sputter depositing a film of silicon on the substrate including a second concentration of germanium in Step 306 includes depositing a silicon film with an additional fourth concentration of phosphorous sufficient to create a first Vth shift in the silicon film.

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Please delete the four paragraphs beginning on page 12, from line 14 and continuing through page 13, line 15, and substitute therefor the following four paragraphs.

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A6  
When Step 404 forms a target with a first concentration of nickel in the range of 0.01 to 0.5 at %, Step 408 forming an amorphous silicon film including a second concentration of nickel in the range of 0.01 to 0.5 at %. Preferably, the first concentration of Ni in the target is in the range of 0.05 to 0.2 at %.

In some aspects of the invention, forming a target of single-crystal silicon in Step 404 includes adding a first concentration of nickel with a third concentration of phosphorous less than  $5 \times 10^{17}$  atoms/cm<sup>3</sup>. Then, Step 408 forms a silicon film including a second concentration of nickel and a fourth

concentration of phosphorous sufficient to create a first  $V_{th}$  shift in the silicon film. The definition of the first  $V_{th}$  shift is dependent upon the desired threshold adjustment of the final product TFT.

Step 410 anneals the silicon film including the nickel first impurity to form a nickel silicide. Step 412 anneals the silicon film with the nickel silicide to crystallize the silicon film.

Ab When Step 404 forms a target of single-crystal silicon with a first concentration of germanium in the range of 5 to 30 at %, Step 408 forms an amorphous silicon film including a second concentration of germanium in the range of 5 to 30 at %. If Step 404 forms a target of single-crystal silicon including a first concentration of germanium and an additional third concentration of phosphorous less than  $5 \times 10^{17}$  atoms/cm<sup>3</sup>, Step 408 forms an amorphous silicon film including a second concentration of germanium and an additional fourth concentration of phosphorous sufficient to create a first  $V_{th}$  shift in the silicon film.

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#### IN THE CLAIMS:

Please amend claims 2, 4-6, 9, 15, 17-19, and 22 as follows.

1. (Unchanged) In the fabrication of liquid crystal displays (LCDs), a method for forming silicon films with a controlled amount of trace impurities, the method comprising:

forming a target including silicon and a first concentration of a first impurity;

supplying a substrate; and

sputter depositing a film of silicon on the substrate including a second concentration of the first impurity.